California Energy Action Plan

August 25, 2005, Transmission Emergency In Southern California

Sean Gallagher
California Public Utilities Commission

Armando Perez
California Independent System Operator

Sacramento, CA
September 12, 2005

Loss of DC Transmission Line Caused Transmission Emergency

- At 3:47pm on August 25, the Pacific DC Intertie (PDCI) transmission line tripped offline.
- ISO load was running about 2,200 MW higher than anticipated, due to temperatures up to 14 degrees higher than forecast.
- The ISO had issued a notice restricting maintenance operations in Southern California, but the ISO was not in a Staged emergency.
- The loss of the PDCI with 2,600 MW flowing across it caused the ISO to declare a Transmission Emergency.

Both Interruptible and Firm Load Was Dropped

- At 3:51 pm, the ISO requested 800 MW of SCE's interruptible load off: 465 MW interruptible load, 253 MW AC cycling, and 47 MW pump load.
- At 3:52 BPA RAS initiated, tripping 2,249 MW of Northwest generation.
- At 3:53 pm the ISO requested firm load dropping of 800 MW (272,000 customers) from SCE, and 100 MW (51,413 customers) from SDG&E. Firm Load dropping was also requested from Pasadena (7 MW), Vernon (4.5 MW), Anaheim (13.5 MW) and Azusa (1 MW).
- Metropolitan Water District took off 55 MW of pump load; various municipal participants removed 26 MW of firm load. CDWR pumps were already off.
- SCE had sufficient notice to utilize its individual circuit load dropping scheme, so essential circuits were protected.

Outage Was Not Due To Insufficient Generating Resources

- Event was a Transmission Emergency, not a Stage 3 Emergency.
- A Stage 3 Emergency is called when reserve requirements and load demand exceed available generating resources.
- A Transmission Emergency is declared for “any event that threatens, harms, or limits capabilities of any element of the transmission grid and threatens grid reliability.”

Firm Load Was Restored In Less Than One Hour

- At 4:30 pm, the PDCI line was fully restored and operational.
- According to SCE, restoration of firm load began at 4:20 pm (the ISO states it ordered restoration of firm load at 4:14 pm.)
- The full 800 MW of firm load dropped in SCE territory was back in service at 4:41 pm
- SDG&E restored all of its firm load by 5:00 pm.
- Interruptible load was restored at 5:08 pm.

The Transmission Outage Was Caused By A Malfunction At Sylmar

- Most Transmission facilities are alternating current (AC) facilities.
- Direct current (DC) requires converter stations at both the sending and receiving ends to convert the current from DC back to AC.
- The PDCI has converter stations at Celilo (BPA service territory) and at Sylmar (LADWP territory.) The outage was caused at the Sylmar station.
- The CPUC sent an investigator to the Sylmar station on August 26. LADWP reported that the outage cause was a malfunction of a flow relay (a relay that contains oil and is operated by the flow of oil) that caused a circuit interruption (in the converter box, where DC is converted to AC.)
- LADWP bypassed the relay to bring the circuit back online.

The Faulty Relay Will Be Replaced By LADWP

- A scheduled outage is due to take place in October, thus, the relay will be “bypassed” until October when LADWP will install a new one.
- There are other protective devices (other than the flow relay) on the circuit to protect it in case of any problem.